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Evaluation of ERTS-1 Image Sensor
Spatial Resolution in Photographic Form

R. A. Schowengerdt

P. N. Slater

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P. N. Slater (UN237)

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Introduction

This report describes progress on this contract during the Data Analysis Preparation period. No ERTS imagery has been received as of 11/1/72 and our first Standing Order imagery is expected to be received in November or December. A discussion of information obtained from persons representing the aircraft programs which supplement ERTS data is presented. The aspects of this information relevant to our contract objectives are pointed out. Some of these aspects indicate that our Standing Order Form (requesting imagery only over Arizona every 3-4 months) may need to be revised or eliminated in order to obtain suitable data for our purpose. Reliance on retrospective data requests will then be necessary.

Discussion

Our proposed objectives for this ERTS contract require near simultaneous (within 15 minutes) imagery from both the ERTS spacecraft and high altitude aircraft. Therefore, during the period reported here, we have attempted to correlate the time and location of ongoing NASA high altitude aircraft underflights with passes of ERTS-1 over Arizona. Liaison has been established and is being maintained with Dr. Larry Lepley, Director of the ARETS (Arizona Regional Ecological Test Site) program, Bob Erickson of the Ames Research Center and Bill Campbell of EROS Data Center.

At the time of our proposal, it seemed obvious that high-altitude flights over the entire state of Arizona would be conducted during all passes of ERTS-1 over the state. However, this is not the case and some

difficulty in obtaining simultaneous coverage over the state is likely. To our knowledge, the only high altitude flights over the state are being done out of Ames and with the present scheduling, the aircraft arrive over Arizona an hour to an hour and a half after the ERTS pass. We feel that this time difference is too great to satisfy our objectives.

There are several possible solutions to this problem. These are:

- 1) Mr. Erikson will send us underflight imagery taken over the San Francisco-Monterey Bay area which he believes to be simultaneous with the ERTS frame taken on 7/25/72. If simultaneity is verified we will request copies of that ERTS frame. Mr. Erikson will co-operate with us in establishing other simultaneous coverage in other possible areas.
- 2) We will request the Ames group to arrange at least one flight which is timed early enough to arrive over Arizona during an ERTS pass.
- 3) If simultaneous coverage cannot be obtained, we will resort to other methods of image evaluation, such as edge or line scan analysis. Ideally we would like to use this type of evaluation in conjunction with the approach outlined in our contract.

Future Plans

During the next two month period we should receive our first ERTS images. We will proceed with the acquisition of simultaneous underflight photography from Ames. Depending on the delays in receiving both types of data, we will likely make the first microdensitometer scans during this

period. A Photometric Data Systems (PDS) microdensitometer system has recently been installed at the Kitt Peak National Observatory, adjoining the University of Arizona campus. We will request the use of this instrument for the ERTS image analysis.

Finally, a professional paper presented during this period is enclosed. The paper was not submitted earlier to the National Technical Information Service (NTIS) for public release because it does not describe any analysis of ERTS images. However, the paper is pertinent to this contract in that it describes rather completely the techniques to be used.